

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**  
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In re Application of:	:	Examiner: Emily P. Pham
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Thomas SCHUSTER et al.	:	
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For: CONVERTER	:	
	:	
	:	Art Unit: 2838
Filed: June 23, 2006	:	
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Serial No.: 10/584,337	:	
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**VIA EFS-WEB**

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 Commissioner for Patents  
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Signature: /Helen Tam/  
 Helen Tam

**REPLY BRIEF PURSUANT TO 37 C.F.R. § 41.41**

SIR:

This paper is responsive to the “Examiner’s Answer” dated November 10, 2010 in connection with the above-captioned application. For the reasons more fully set forth below and in the “Appeal Brief Pursuant to 37 C.F.R. § 41.37” (“the Appeal Brief”), it is respectfully submitted that the present rejections should be reversed.

**I. ARGUMENTS****A. Rejection of Claims 8 to 10 and 12 to 14 Under 35 U.S.C. § 103(a)**

Claims 8 to 10 and 12 to 14 were rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of the AAPA and Zafarana. It is respectfully submitted that the combination of the AAPA and Zafarana does not render unpatentable the presently pending claims for at least the following reasons.

In order for a claim to be rejected for obviousness under 35 U.S.C. § 103(a), the prior art must teach or suggest each element of the claim. *See Northern Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 934 (Fed. Cir. 1990), *cert. denied*, 111 S. Ct. 296 (1990); *In re Bond*, 910 F.2d 831, 834 (Fed. Cir. 1990). In addition, as clearly indicated by the Supreme Court, it is “important to identify a reason that would have prompted a person of ordinary

skill in the relevant field to combine the [prior art] elements” in the manner claimed. *See KSR Int’l Co. v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007). Further, the Supreme Court in *KSR* noted that the analysis supporting a rejection under 35 U.S.C. 103 should be made explicit. M.P.E.P. §2143.

Claim 8 relates to a converter, including, *inter alia*, the features of a device adapted to sense currents fed to an electric motor powered by the converter, the device arranged inside the converter, signals of the device fed to a nonlinear filter, output signals of the nonlinear filter fed to an additional filter that is connected to an analog-to-digital converter.

The AAPA is identified in the Final Office Action as the material appearing on page 1, lines 5 to 13 of the Specification, to wit:

In the case of converters, it is conventional that the actual value  $I_{actual}$  of the motor current can be measured, the current-sensing device being situated in the converter. The signals provided by the current-sensing device of the control electronics are initially supplied to a filter 1, e.g., a PT1 filter, as shown in Figure 1. Therefore, microcontroller 2 is provided with filtered measuring signals, and interference signals become suppressible. The PT1 filter may take the form of a low-pass filter having a time constant of, e.g., 20  $\mu$ s.

As acknowledged in the Final Office Action at page 4, the AAPA does not disclose a nonlinear filter, where output signals of the nonlinear filter are fed to an additional filter. The AAPA also does not disclose an additional filter that is connected to an analog-to-digital converter, as presently claimed. Instead, the AAPA discusses a device in which signals provided by a current-sensing device of control electronics are initially supplied to a filter, and the filtered measuring signals are then provided to a microcontroller to suppress interference signals.

Zafarana does not overcome the critical deficiencies noted above with respect to the AAPA. Zafarana discloses a non-linear voltage regulator for an automotive alternator. Zafarana is cited in the Final Office Action for the disclosure in Figure 3 of providing output signals from a nonlinear filter to a linear filter. However, Zafarana lacks any disclosure relating to an electric motor powered by the presently claimed converter that includes a device adapted to sense currents fed to the electric motor. Rather, Zafarana discloses a voltage regulator, which has a linear filter, a comparator, and a stretcher filter, connected in cascade with one another between an input terminal and an output terminal of the regulator. The input terminal receives an error signal converted by the comparator into a square-wave error signal, and the output terminal delivers a square-wave output control signal, having a

stretched duty cycle over the square-wave error signal by a time delay introduced from the stretcher filter. *See* Zafarana, column 3, lines 14 to 24. As cited in the Final Office Action, Figure 3 of Zafarana discloses a voltage regulator 1. At column 3, lines 35 to 43, Zafarana discloses:

The regulator 1 comprises a linear filter 2, specifically of the low-pass type, a comparator 3, and a stretcher filter 4, which are connected, in cascade with one another, between an input terminal I1 and an output terminal O1 of the regulator 1.

In particular, the linear filter 2 has an input terminal I2 connected to the input terminal I1 of the regulator 1, and an output terminal O2 connected to an input terminal I3 of the comparator 3. The latter has an output terminal O3 connected to an input terminal I4 of the stretcher filter 4. The stretcher filter 4 has an output terminal O4 connected to the output terminal O1 of the regulator 1.

One of ordinary skill in the art would understand from Figure 3 that the input terminal I2 of the linear filter 2 receives signals from the non-linear filter of the non-linear filtering section 5 of the regulator 1.

Zafarana clearly discloses that the linear filter, comparator, and stretcher filter are connected in cascade with one another. One of ordinary skill in the art following the disclosure of Zafarana would understand that the output from a linear filter should be supplied to a comparator, and the output of the comparator should then be supplied to a stretcher filter. That is not the arrangement presently claimed. Rather, one of ordinary skill in the art following the disclosure of Zafarana would not connect the output of the disclosed linear filter 2 to an analog-to-digital converter. Thus, even if one of ordinary skill in the art combined the disclosure of Zafarana with the AAPA, the resulting combination would not provide the presently claimed converter.

Nonetheless, the Final Office Action at page 8 asserts that “[o]ne of ordinary skill in the art should know to exclude the comparator and stretcher filter.” However, as described above, Zafarana merely describes a linear filter, comparator, and stretcher filter that are intended to be cascaded together. In this regard, Zafarana describes at column 1, lines 35 to 54, and 65 to 67 that a linear filter alone is not sufficient to filter out a noise signal. Thus, a comparator is needed to produce a square wave, and a stretcher filter is further required to suppress spurious comparator switchings. Moreover, in order to completely remove spurious comparator switchings, Zafarana provides a non-linear filtering section. *See* Zafarana, column 5, lines 25 to 29. Thus, according to Zafarana, the non-linear filtering section is effective only because it is used in combination with the linear filter, comparator, and

stretcher filter cascaded together. Accordingly, contrary to the assertions of the Final Office Action, one of ordinary skill in the art would not be motivated to exclude the comparator and stretcher filter as described by Zafarana, since those elements are essential to the proper function of the device of Zafarana.

Further, the Advisory Action asserts the following:

One of ordinary skill in the art following the disclosure of Zafarana in light of AAPA should easily recognize that to convert the output of the linear filter into digital signal, it is required to connect the output of the linear filter to an analog to digital converter [sic] instead of a comparator.

Assuming that one of ordinary skill in the art would understand to use an analog to digital converter to convert the output to a digital signal, which is not necessarily conceded by Applicants, it is respectfully submitted that one of ordinary skill in the art “following the disclosure of Zafarana,” as stated in the Advisory Action, would not connect the output of the linear filter to an analog to digital converter “instead of a comparator.” In this regard, as set forth above, Zafarana teaches that “[p]rior approaches ... at reducing the amplitude of the noise signal by filtering ... through a linear filter ... [has] never [been] fully successful in filtering out the noise signal.” *See* Zafarana, column 1, lines 35 to 43. Thus, Zafarana teaches the use of a comparator and a stretcher filter in combination with a linear filter in order to further filter the noise signal. *See* Zafarana, column 1, lines 45 to 54, and 65 to 67. Therefore, it is respectfully submitted that one of ordinary skill in the art “following the disclosure of Zafarana” would not connect the output of the linear filter to an analog to digital converter instead of a comparator because such a modification of Zafarana would eliminate the benefits of the inclusion of a comparator and a stretcher filter specifically disclosed by Zafarana. In short, such a modification of Zafarana is in direct opposition to the disclosure of Zafarana.

Moreover, the Advisory Action asserts the following:

It is noted that the combination of AAPA and Zafarana emphasizes only on the usage and function of the nonlinear filter and the linear filter not the function of the whole device of Zafarana.

However, it is respectfully submitted that “the usage and function of the nonlinear filter and the linear filter” described by Zafarana is dependent upon “the function of the whole device of Zafarana.” As more fully set forth above, Zafarana states that the use of a linear filter alone is insufficient and therefore describes the use of a comparator and

stretcher filter in combination with the linear filter. Furthermore, Zafarana describes that a nonlinear filter may be provided to remove spurious switchings of the comparator and stretcher filter. *See* Zafarana, column 5, lines 25 to 29. Thus, the inclusion of a nonlinear filter in Zafarana is dependent upon the inclusion of a comparator and stretcher filter. Accordingly, if the comparator and stretcher filter of Zafarana are removed, then there is also no need to include a nonlinear filter. Therefore, contrary to the assertions of the Advisory Action, it is respectfully submitted that one of ordinary skill in the art following the disclosure of Zafarana would not be motivated to utilize only the nonlinear filter and linear filter of Zafarana because Zafarana does not disclose any benefits of such a combination, absent the additional inclusion of a comparator and stretcher filter, i.e., the whole device of Zafarana.

Furthermore, in the Examiner's Answer at pages 7 to 14, the Examiner refers to column 4, lines 33 to 36 of Zafarana, which states that "the non-linear filter 7 provided is advantageous in that it reduces the noise amplitude at the input terminal I2 of the linear filter 2." In this regard, the Examiner states that:

FIG 3 of Zafarana shows the direction of arrow from non-linear filter 7 to linear filter 2, the direction of arrow from linear filter 2 to comparator 3, and the direction of arrow from comparator 3 to stretcher filter 4, those arrow directions and lines 1-3 of col. 5 of Zafarana demonstrate that the circuitry is open and it does not have any feedback from output O1 to non-linear filter thus it is impossible to have a backward effect from the stretcher filter 4, the comparator 3, the linear filter 2, to the non-linear filter 7 if comparator and stretcher filter are removed.

The Examiner apparently asserts that because there is no "backward effect," the function of the non-linear filter 7 is unrelated to the functions of the comparator 3 and stretcher filter 4. However, no arguments related to any "backward effect," as suggested by the Examiner, have been presented. Instead, Zafarana explicitly states at column 5, lines 25 to 29 that a non-linear filter, in combination with a comparator and stretcher filter, is effective to remove spurious comparator switchings. Thus, the non-linear filter, comparator and stretcher filter are indeed functionally related.

Further, in this regard, it is respectfully submitted that the Examiner has considered only a portion of the disclosure of Zafarana, and not the entire disclosure of Zafarana. In this regard, as more fully set forth above, Zafarana describes at column 1, lines 35 to 54, and 65 to 67 that ***a linear filter alone is not sufficient*** to filter out a noise signal. Thus, ***a comparator is needed*** to produce a square wave, and ***a stretcher filter is further required*** to suppress spurious comparator switchings. Moreover, ***a non-linear filtering***

*section is required* in order to completely remove spurious comparator switchings. *See* Zafarana, column 5, lines 25 to 29. Thus, according to Zafarana, the non-linear filtering section is effective in removing spurious switchings of the comparator. Accordingly, even without any “backward effect,” as suggested by the Examiner, the non-linear filter advantageously removes spurious switchings of the comparator located downstream of the non-linear filter. Therefore, contrary to the Examiner’s assertions, because the non-linear filter advantageously affects the comparator and stretcher filter, one of ordinary skill in the art would not be motivated to exclude the comparator and stretcher filter of Zafarana, since all the elements of non-linear filter, linear filter, comparator, and stretcher filter together are essential to the proper function of the device of Zafarana.

Accordingly, it is respectfully submitted that the combination of the AAPA and Zafarana does not disclose, or even suggest, all of the features included in claim 8. Therefore, it is respectfully submitted that the combination of the AAPA and Zafarana does not render unpatentable the presently pending claims for at least the foregoing reasons.

As for claims 9, 10, and 12 to 14, which ultimately depend from claim 8 and therefore include all of the features included in claim 8, it is respectfully submitted that the combination of the AAPA and Zafarana does not render unpatentable these dependent claims for at least the reasons more fully set forth above in support of the patentability of claim 8.

In view of all of the foregoing, reversal of this rejection is respectfully requested.

**B. Rejection of Claim 11 Under 35 U.S.C. § 103(a)**

Claim 11 was rejected under 35 U.S.C. § 103(a) as unpatentable over the combination of the AAPA, Zafarana, and Goldberg. It is respectfully submitted that the combination of the AAPA, Zafarana, and Goldberg does not render unpatentable the present claim for at least the following reasons.

Claim 11 ultimately depends from claim 8. As more fully set forth above, the combination of the AAPA and Zafarana does not disclose, or even suggest, all of the features included in claim 8. Goldberg also does not disclose, or even suggest, all of the features included in claim 8, and thus, fails to cure this critical deficiency. In this regard, Goldberg is cited in the Final Office Action for the alleged disclosure of a run-up transmitter including a comparator and an integrator. However, even if one of ordinary skill in the art would combine the disclosure of Goldberg with the AAPA and Zafarana, the resulting combination would not provide the presently claimed converter. As such, it is respectfully submitted that

the combination of the AAPA, Zafarana, and Goldberg does not render unpatentable claim 11.

Accordingly, it is respectfully submitted that the combination of the AAPA, Zafarana, and Goldberg does not disclose, or even suggest, all of the features included in claim 8, from which claim 11 ultimately depends. As such, it is respectfully submitted that the combination of the AAPA, Zafarana, and Goldberg does not render unpatentable claim 11, which ultimately depends from claim 8.

In view of all of the foregoing, reversal of this rejection is respectfully requested.

## **II. CONCLUSION**

For at least the reasons indicated above and those set forth in the Appeal Brief, Appellants respectfully submit that the art of record does not disclose or suggest the subject matter as recited in the claims of the above-identified application. Accordingly, it is respectfully submitted that the subject matter as set forth in the claims of the present application is patentable.

In view of all of the foregoing, reversal of all outstanding rejections is therefore respectfully requested.

Respectfully submitted,

Dated: January 4, 2011

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